

## ISOPROPYL ALCOHOL

CAS Registry Number: 67-63-0



Molecular Formula:  $\text{C}_3\text{H}_8\text{O}$

Isopropyl alcohol is a volatile, flammable, clear, colorless liquid which has a slight odor resembling that of a mixture of ethanol and acetone. It has a bitter taste. Although miscible with water, other alcohols, ether, and chloroform, it is insoluble in salt solutions (Merck, 1989).

### Physical Properties of Isopropyl alcohol

Synonyms: isopropanol; propan-2-ol; 2-propanol; sec-propyl alcohol; dimethylcarbinol; petrohol

Molecular Weight:	60.09
Boiling Point:	82.5 °C
Melting Point:	-88.5 °C
Flash Point:	11.7 °C (53 °F) (closed cup)
Vapor Pressure:	44 mm Hg at 25 °C
Density/Specific Gravity:	0.7851 at 20/4 °C (water = 1)
Log/Octanol Water Partition Coefficient:	0.05
Dissociation Constants:	pka: 17.1 at 25 °C
Autoignition Temp:	455.6 °C (852 °F)
Henry's Law Constant:	$8.07 \times 10^{-6}$ atm-m <sup>3</sup> /mole
Vapor Density:	2.08 (air = 1)
Conversion Factor:	1 ppm = 2.45 mg/m <sup>3</sup>

(HSDB, 1991)

## SOURCES AND EMISSIONS

### A. Sources

Isopropyl alcohol is used in the manufacture of acetone, glycerol, isopropyl acetate, shellacs, quick drying inks, and creosote. It is a solvent for essential and other oils, alkaloids, gums, resins, coatings and cellulose, and a deicing agent for liquid fuels, lacquers, and extraction processes. It is also used in antifreeze compositions and as an antiseptic (Sax, 1987; Howard, 1990; Merck, 1989).

Isopropyl alcohol is registered as an antimicrobial, bactericide, fungicide, and virucide. It is used for sterilizing and disinfecting surfaces in hospitals, dairy farms, food processing plants, eating establishments, and in household dwellings. Isopropyl alcohol is also registered for use as a topical disinfectant in animal areas in and around the house, in veterinary institutions, farm structures, poultry areas, and in hatcheries and zoo animal premises. It is registered for use in

barbershops for cleaning hair cutting and styling instruments and equipment. Isopropyl alcohol is also registered as an adjuvant, used to facilitate pesticide applications in agricultural settings, and as an adjuvant in industrial water washer, cooler, and condenser systems (DPR, 1996).

The licensing and regulation of pesticides for sale and use in California are the responsibility of the Department of Pesticide Regulation (DPR). Information presented in this fact sheet regarding the permitted pesticidal uses of isopropyl alcohol has been collected from pesticide labels registered for use in California and from DPR's pesticide databases. This information reflects pesticide use and permitted uses in California as of October 15, 1996. For further information regarding the pesticidal uses of this compound, please contact the Pesticide Registration Branch of DPR (DPR, 1996).

The primary stationary sources that have reported emissions of isopropyl alcohol in California are the leather tanning and finishing industry, manufacture of miscellaneous food and kindred products, and commercial printing facilities (ARB, 1997b).

#### B. Emissions

Emissions can be generated from petroleum storage, auto exhaust, plastics combustion, printing, sewage treatment, wood pulping, as well as consumer products (Howard, 1990). The total emissions of isopropyl alcohol from stationary sources in California are estimated to be at least 310,000 pounds per year, based on data reported under the Air Toxics "Hot Spots" Program (AB 2588) (ARB, 1997b).

#### C. Natural Occurrence

Isopropyl alcohol occurs as a plant volatile and has been found in animal waste and microbes (Howard, 1990).

### **AMBIENT CONCENTRATIONS**

No Air Resources Board data exist for ambient measurements of isopropyl alcohol.

### **INDOOR SOURCES AND CONCENTRATIONS**

Isopropyl alcohol is a component of many antiseptic and cosmetic products used indoors. No information about indoor concentrations of isopropyl alcohol was found in the readily-available literature.

### **ATMOSPHERIC PERSISTENCE**

Isopropyl alcohol exists in the atmosphere in the gas phase. The dominant atmospheric loss

process for isopropyl alcohol in the troposphere is by reaction with the hydroxyl radical. Based on this reaction, the atmospheric half-life and lifetime of isopropyl alcohol is estimated to be 1.9 days and 2.7 days, respectively (Atkinson, 1994). The major reaction product from this reaction is acetone (Atkinson, 1995).

## **AB 2588 RISK ASSESSMENT INFORMATION**

Although isopropyl alcohol is reported as being emitted in California from stationary sources no health values (cancer or non-cancer) are listed in the California Air Pollution Control Officers Association Air Toxics “Hot Spots” Program Revised 1992 Risk Assessment Guidelines for use in risk assessments (CAPCOA, 1993).

## **HEALTH EFFECTS**

Probable routes of human exposure to isopropyl alcohol are inhalation and ingestion.

**Non-Cancer:** Isopropyl alcohol vapors are mildly irritating to the eyes and upper respiratory tract. At high levels, isopropyl alcohol can cause central nervous system (CNS) depression. Symptoms of poisoning include dizziness, incoordination, headache, and confusion. Isopropyl alcohol is metabolized to acetone which may prolong or potentiate the CNS depression. Isopropyl alcohol may enhance the hepatotoxicity of carbon tetrachloride (Olson, 1994).

The United States Environmental Protection Agency (U.S. EPA) has not established a Reference Concentration (RfC) or an oral Reference Dose (RfD) for isopropyl alcohol (U.S. EPA, 1995a).

Limited information is available on the reproductive toxicity of isopropyl alcohol. In the rat, high maternally-toxic inhalation exposures were associated with reduced fetal weight and increased skeletal and visceral malformations (HSDB, 1995).

**Cancer:** The U.S. EPA has not classified isopropyl alcohol as to its carcinogenic potential (U.S. EPA, 1995a). The International Agency for Research on Cancer has classified isopropyl alcohol in Group 3: Not classifiable as to its carcinogenic potential (IARC, 1987a).

